

What is claimed is:

1. A device comprising a biomedical device at least one surface of the biomedical device comprising hydroxyl groups, amino groups, or mixtures thereof, the surface having a coating effective amount of a carboxyl functional polymer coupled thereto by a coupling effective amount of at least one coupling agent.
2. The device of claim 1 wherein the biomedical device is a contact lens.
3. The device of claim 1 wherein the surface comprises hydroxyl groups.
4. The device of claim 1 wherein the surface comprises amino groups.
5. The device of claim 1 wherein the carboxyl functional polymer is poly(acrylic acid), poly(methacrylic acid), poly(maleic acid), poly(itaconic acid), block or random copolymers of methacrylic acid or acrylic acid, acrylic acid, maleic acid, or itaconic acid with a reactive vinyl monomer, or mixtures thereof.
6. The device of claim 5 wherein the carboxyl functional polymer is poly(acrylic acid).
7. The device of claim 1 wherein the coupling agent is selected from the group consisting of carbodiimides, N, N'-carbonyldiimidazole, phosphoryl chloride, titanium tetrachloride, sulfuryl chloride fluoride, chlorosulfonyl isocyanate, phosphorus iodide, pyridinium salts of tributyl amine, phenyl dichlorophosphate, polyphosphate ester, chlorosilanes, a mixture of tributyl phosphorus and phenyl isocyanate, a mixture of alkyl chloroformates and triethyl amine, a mixture of 2-chloro-1,3,5-trinitrobenzene and pyridine, a mixture of methyl sulfuryl chloride and diethyl amine, and a mixture of triphenylphosphine, carbon tetrachloride and triethyl amine.

8. The device of claim 7 wherein the coupling agent is a carbodiimide.

9. The device of claim 8 wherein the carbodiimide is 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide.

10. A contact lens at least one surface of which comprises a polymer selected from the group consisting of silicone elastomer, hydrogel, or silicone-containing hydrogel, the polymer having functional groups selected from the group consisting of hydroxyl groups, amino groups, and mixtures thereof, the surface having a coating effective amount of a carboxyl-functional polymer coupled thereto by a coupling effective amount of at least one coupling agent selected from the group consisting of carbodiimides, N, N'-carbonyldiimidazole, phosphoryl chloride, titanium tetrachloride, sulfonyl chloride fluoride, chlorosulfonyl isocyanate, phosphorus iodide, pyridinium salts of tributyl amine, phenyl dichlorophosphate, polyphosphate ester, chlorosilanes, a mixture of tributyl phosphorus and phenyl isocyanate, a mixture of alkyl chloroformates and triethyl amine, a mixture of 2-chloro-1,3,5-trinitrobenzene and pyridine, a mixture of methyl sulfonyl chloride and diethyl amine, and a mixture of triphenylphosphine, carbon tetrachloride and triethyl amine, which carboxyl-functional polymer is selected from the group consisting of poly(acrylic acid), poly(methacrylic acid), poly(maleic acid), poly(itaconic acid), block or random copolymers of methacrylic acid or acrylic acid, acrylic acid, maleic acid, or itaconic acid with a reactive vinyl monomer, and mixtures thereof.

11. The device of claim 10 wherein the surface comprises hydroxyl groups.

12. The device of claim 10 wherein the surface comprises amino groups.

13. The device of claim 10 wherein the surface comprises a silicone hydrogel.

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14. The device of claim 10 wherein the surface comprises silicone elastomer.

15. The device of claim 10 wherein the surface comprises a hydrogel

5 16. The device of claim 10 wherein the carboxyl functional polymer is poly(acrylic acid).

17. The device of claim 10 wherein the coupling agent is a carbodiimide.

10 18. The device of claim 17 wherein the carbodiimide is 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide.

15 19. A contact lens at least one surface of which comprises a polymer selected from the group consisting of silicone elastomer, hydrogel, and silicone-containing hydrogel, the polymer having hydroxyl groups, amino groups, or mixtures thereof, the at least one surface having a coating effective amount of poly(acrylic acid) coupled thereto by a coupling effective amount of a carbodiimide coupling agent.

20. The device of claim 19 wherein the molecular weight of the poly(acrylic acid) is about 100,000 to about 1,000,000.

21. The device of claim 19 wherein the surface comprises silicone elastomer.

22. The device of claim 19 wherein the surface comprises a hydrogel

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23. The device of claim 19 wherein the surface comprises a silicone containing hydrogel.

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1 24. The device of claim 19 wherein the carbodiimide is 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide.

5 25. The device of claim 19 wherein the surface comprises hydroxyl groups.

26. The device of claim 19 wherein the surface comprises amino groups.

10 27. A process for manufacturing biomedical devices comprising the step of contacting at least one surface of a biomedical device with a coating effective amount of at least one carboxyl functional hydrophilic polymer and a coupling effective amount of at least one coupling agent.

15 28. The process of claim 27 wherein the biomedical device is a contact lens.

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15 29. The device of claim 27 wherein the carboxyl functional polymer is poly(acrylic acid), poly(methacrylic acid), poly(maleic acid), poly(itaconic acid), block or random copolymers of methacrylic acid or acrylic acid, acrylic acid, maleic acid, or itaconic acid with a reactive vinyl monomer.

20 30. The device of claim 27 wherein the carboxyl functional polymer is poly(acrylic acid).

25 31. The process of claim 27 wherein the coupling agent is selected from the group consisting of carbodiimides, N, N'-carbonyldimidazole, phosphoryl chloride, titanium tetrachloride, sulfonyl chloride fluoride, chlorosulfonyl isocyanate, phosphorus iodide, pyridinium salts of tributyl amine, phenyl dichlorophosphate, polyphosphate ester, chlorosilanes, a mixture of tributyl phosphorus and phenyl isocyanate, a mixture of alkyl chloroformates and triethyl amine, a mixture of 2-chloro-1,3,5-trinitrobenzene and pyridine, a mixture of methylsulfonyl chloride and

diethyl amine, and a mixture of ~~triphenylphosphine~~²³, carbon tetrachloride and triethyl amine.

32. The process of claim 27 wherein the coupling agent is a carbodiimide.

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33. The process of claim 32 wherein the carbodiimide is 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide.

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